IN THE CLAIMS:

1. (Withdrawn) A method of generating a mucosal cell that produces a protein in response to a nutrient, comprising:
   (a) contacting a mucosal cell with a polynucleotide comprising an expression control element in operable linkage with a nucleic acid encoding a protein under conditions allowing transformation of the cell; and
   (b) identifying a cell transformant that produces the protein in a nutrient-regulatable manner, thereby generating a mucosal cell that produces a protein in response to a nutrient.
2. (Withdrawn) An isolated or cultured mucosal cell that produces a protein regulatable by a nutrient, wherein expression of the protein is conferred by a transgene comprising an expression control element in operable linkage with a nucleic acid encoding the protein.
3. (Withdrawn) The mucosal cell of claim 2, wherein the nutrient increases expression or secretion of the protein.
4. (Withdrawn) The mucosal cell of claim 2, wherein the nutrient comprises a sugar, a fat, a carbohydrate or starch, an amino acid or polypeptide, a triglyceride, a vitamin, a mineral, or cellulose.
5. (Withdrawn) The mucosal cell of claim 2, wherein the expression control element comprises a nutrient-regulatable element.
6. (Withdrawn) The mucosal cell of claim 5, wherein the nutrient-regulatable element comprises a gut endocrine promoter.
7. (Withdrawn) The mucosal cell of claim 6, wherein the gut endocrine promoter comprises a glucose-dependent insulinotropic polypeptide (GIP) promoter.
8. (Withdrawn) The mucosal cell of claim 2, wherein the nucleic acid encodes insulin.
9. (Withdrawn) The mucosal cell of claim 2, wherein the nucleic acid encodes leptin, GLP-1, GLP-2, cholecystokinin, a glucagon antagonist, a growth hormone, a clotting factor, or an antibody.
10. (Withdrawn) The mucosal cell of claim 2, wherein the mucosal cell is obtained from a subject.
11. (Withdrawn) The mucosal cell of claim 11, wherein the subject is human.

12. (Withdrawn) The mucosal cell of claim 2, wherein the mucosal cell is obtained from a tissue or organ of the gastrointestinal tract or derived from a cell line of gut origin.
13. (Withdrawn) The mucosal cell of claim 12, wherein the tissue is the stomach.
14. (Withdrawn) The mucosal cell of claim 12, wherein the tissue is the duodenum.
15. (Withdrawn) The mucosal cell of claim 2, wherein the mucosal cell is an endocrine cell.
16. (Withdrawn) The mucosal cell of claim 15, wherein the endocrine cell is a K-cell.
17. (Withdrawn) The mucosal cell of claim 2, wherein the mucosal cell is a stem cell.
18. (Withdrawn) The mucosal cell of claim 2, wherein the mucosal cell is a non-endocrine cell.
19. (Withdrawn) The mucosal cell of claim 2, wherein the expression control element in operable linkage with a nucleic acid further comprises a vector.
20. (Withdrawn) The mucosal cell of claim 19, wherein the vector comprises a viral vector.
21. (Withdrawn) A method of treating a subject having, or at risk of having, a disorder treatable by producing a protein in a tissue, comprising implanting one or more mucosal cells of claim 2 into the tissue in an amount effective for treating the disorder.
22. (Withdrawn) The method of claim 21, wherein the disorder comprises a hyperglycemic condition.
23. (Withdrawn) The method of claim 22, wherein the hyperglycemic condition comprises diabetes.
24. (Withdrawn) The method of claim 21, where the subject has a fasting plasma glucose level greater than 110 mg/dl.
25. (Withdrawn) The method of claim 21, wherein the disorder comprises obesity or an undesirable body mass.
26. (Withdrawn) The method of claim 21, wherein the mucosal cell expresses insulin.
27. (Withdrawn) The method of claim 21, wherein the mucosal cell expresses leptin, GLP-1, GLP-2, cholecystokinin, a glucagon antagonist, a growth hormone, a clotting factor, or an antibody.
28. (Withdrawn) The method of claim 21, wherein the tissue is a mucosal tissue.
29. (Withdrawn) The method of claim 21, wherein the tissue is a non-mucosal tissue.
30. (Withdrawn) The method of claim 29, wherein the non-mucosal tissue is liver, pancreas or muscle.

31. (Currently Amended) A method of treating a subject having, or at risk of having, a disorder treatable by producing ~~a therapeutic protein~~ insulin in a mucosal tissue, comprising contacting gut or gastrointestinal mucosal tissue cells in the subject transformed with a polynucleotide comprising ~~an expression control element~~ gut endocrine promoter in operable linkage with a nucleic acid encoding ~~the therapeutic protein~~ insulin with ~~a nutrient~~ an amount of sugar, carbohydrate, starch, polypeptide, amino acid or fat that induces production of the ~~protein~~ insulin by the transformed gut or gastrointestinal mucosal tissue cells in an amount effective to treat the disorder.
32. (Previously Presented) The method of claim 31, wherein the disorder comprises a hyperglycemic condition.
33. (Previously Presented) The method of claim 32, wherein the hyperglycemic condition comprises diabetes.
34. (Previously Presented) The method of claim 33, wherein the diabetes comprises type I diabetes.
35. (Previously Presented) The method of claim 31, wherein the subject has a fasting plasma glucose level greater than 110 mg/dl.
36. (Previously Presented) The method of claim 33, wherein the diabetes comprises insulin-dependent diabetes.
37. (Cancelled)
38. (Currently Amended) The method of claim 31, wherein the ~~nutrient~~ sugar, carbohydrate, starch, polypeptide, amino acid or fat increases expression or secretion of the ~~protein~~ insulin.
39. (Currently Amended) The method of claim 38, wherein expression of the ~~protein~~ insulin is increased in non-endocrine cells.
40. (Currently Amended) The method of claim 38, wherein secretion of the ~~protein~~ insulin is increased in endocrine cells.
41. (Cancelled)
42. (Cancelled)
43. (Currently Amended) The method of claim [[42]] 31, wherein the ~~nutrient-regulatable element comprises a~~ gut endocrine promoter[[,]] comprises a functional variant ~~thereof,~~ or a functional subsequence thereof, wherein the gut endocrine promoter functional

variant or subsequence retains all or a part of non-variant or full-length gut endocrine promoter expression function.

44. (Previously Presented) The method of claim 43, wherein the gut endocrine promoter comprises a glucose-dependent insulinotropic polypeptide (GIP) promoter.

45. (Cancelled)

46. (Cancelled)

47. (Currently Amended) The method of claim 31, wherein the gut or gastrointestinal mucosal cell is present in a tissue or organ of the gastrointestinal tract of a subject.

48. (Previously Presented) The method of claim 47, wherein the tissue is the intestine.

49. (Previously Presented) The method of claim 47, wherein the tissue is the gut.

50. (Previously Presented) The method of claim 31, wherein the mucosal cell is an endocrine cell.

51. (Previously Presented) The method of claim 50, wherein the endocrine cell is a K-cell.

52. (Previously Presented) The method of claim 50, wherein the mucosal cell is a stem cell.

53. (Previously Presented) The method of claim 31, wherein the mucosal cell is a non-endocrine cell.

54. (Currently Amended) The method of claim 31, wherein the ~~expression control element~~ gut endocrine promoter in operable linkage with a nucleic acid further comprises a vector.

55. (Previously Presented) The method of claim 54, wherein the vector comprises a viral vector.

56. –70. (Cancelled)

71. (New) A method of treating a subject having, or at risk of having, a disorder treatable by producing leptin in a mucosal tissue, comprising contacting gut or gastrointestinal mucosal tissue cells in the subject transformed with a polynucleotide comprising a gut endocrine promoter in operable linkage with a nucleic acid encoding leptin with an amount of sugar, carbohydrate, starch, polypeptide, amino acid or fat that induces production of the leptin by the transformed gut or gastrointestinal mucosal tissue cells in an amount effective to treat the disorder.

72. (New) The method of claim 71, wherein the disorder comprises obesity or an undesirable body mass.

73. (New) The method of claim 71, wherein the sugar, carbohydrate, starch, polypeptide, amino acid or fat increases expression or secretion of the leptin.

74. (New) The method of claim 71, wherein expression of the leptin is increased in non-endocrine cells.

75. (New) The method of claim 71, wherein secretion of the leptin is increased in endocrine cells.

76. (New) The method of claim 71, wherein the gut endocrine promoter comprises a functional variant or functional subsequence thereof that retains all or a part of non-variant or full-length gut endocrine promoter function.

77. (New) The method of claim 71, wherein the gut endocrine promoter comprises a glucose-dependent insulinotropic polypeptide (GIP) promoter.

78. (New) The method of claim 71, wherein the gut or gastrointestinal mucosal cell is present in a tissue or organ of the gastrointestinal tract of a subject.

79. (New) The method of claim 78, wherein the tissue is the intestine.

80. (New) The method of claim 78, wherein the tissue is the gut.

81. (New) The method of claim 71, wherein the mucosal cell is an endocrine cell.

82. (New) The method of claim 81, wherein the endocrine cell is a K-cell.

83. (New) The method of claim 81, wherein the mucosal cell is a stem cell.

84. (New) The method of claim 71, wherein the mucosal cell is a non-endocrine cell.

85. (New) The method of claim 71, wherein the gut endocrine promoter in operable linkage with a nucleic acid further comprises a vector.

86. (New) The method of claim 85, wherein the vector comprises a viral vector.